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Rugose Spiraling Whitefly: A New Threat to Bangladesh Agriculture

Introduction

Rugose Spiraling Whitefly (RSW), *Aleurodicus rugiopectus* Martin, (Hemiptera: Aleyrodidae) is an invasive insect pest in Bangladesh. Whiteflies are small in size, cryptic in nature, and immature stages attach to the host plant. As a result, whiteflies are one of the most commonly transported arthropod groups. Climate change and global warming could influence new introductions and distributions of exotic whitefly species and increase the chances of their survival in new environments (Simala *et al.* 2015). This species was first recorded in coconut trees at Jashore in May 2019 (Dutta *et al.* 2019); now, RSW is found in 64 districts of Bangladesh.

Host plants

This whitefly is highly polyphagous with a host range of more than 118 hosts belonging to 43 plant families, including several economically important crops (Francis *et al.* 2016, Karthick *et al.* 2018); however, it is a serious threat to coconut (Stocks and Hodges, 2012). RSW being a recent introduction to Bangladesh, it is still in the process of establishing on various plant species within the country. However, RSW has already been recorded in banana, areca palm, hog plum, areca nut, guava and rangan. (Dutta *et al.* 2019)

Distribution

This pest is native to Central America and was first found and described from Belize in 2004. Later, it was reported from Mexico and Guatemala in 2008, Florida in 2009 (Evans, 2008; Francis *et al.* 2016), India in August 2016 (Sundararaj and Selvaraj, 2017), and Bangladesh in May 2019 (Dutta *et al.*, 2019). It primarily infests coconut trees. Transport of seedlings, plant materials, tender coconut, and movement of vehicles assists its spread. Current level of infestation in Bangladesh is high in the west, southwest, and northeast regions; medium in central parts; and low in other parts (Das, 2022).



Fig.1: Current distribution of rugose spiraling whitefly in Bangladesh (Source: Das, 2022)

Rugose Spiraling Whitefly



Biology

Eggs are smooth, elliptical, whitish to yellow, translucent, and laid on the underside of the leaves in a spiral pattern, which is covered with waxy filaments (Fig. 2).

The first instar nymphs that hatch out of eggs are known as the crawlers, as they are mobile and look for suitable places to begin feeding with their piercing and sucking mouthparts. Initially, subsequent instars are immobile, oval, and flat, but become more convex with the progression of their life cycle. They are light to golden yellow in color and fully covered with the waxy filaments (Dutta *et al.*, 2019). Puparia are also covered with wax (Fig. 2).

Adults congregate under surface of leaves and suck the sap (Fig. 2). They are three times larger than the commonly found spiraling whitefly. The honey dew excreted by them induces sooty mold growth, which impedes photosynthesis.

Symptoms of damage

Nymphs and adults congregate on the lower surface of leaves and cause direct damage by sucking the sap. Honeydew excreted gets deposited on the upper surface of the leaves below, resulting in growth of sooty mold and impairment of photosynthesis (Fig.-3). Rugose spiraling whitefly does not kill the host plant, but it interferes with the normal growth.



Fig.2. Life stages of *Aleurodicus rugioperculatus*: 2a) Adult 2b) Eggs 2c) Third instar nymphs 2d) Pupae; Photo Credit: Selvaraj, K.



Fig.3. *Aleurodicus rugioperculatus* symptoms of damage 3a) Adult 3b) Spiraling symptom 3c) Colony 3d) Sooty mold on coconut palm; Photo Credit: Selvaraj, K.

Management

Biological control: A fortuitously introduced parasitoid, *Encarsia guadeloupae* (Hymenoptera: Aphelinidae) has been found attacking this pest in Bangladesh. Surveys should be conducted to identify its distribution, where it has yet to establish, and additional natural enemies occurring on it in Bangladesh. Conservation efforts should be instituted to maximize their benefits. Two biopesticides available in Bangladesh, namely Fizimite (10% Sodium lauryl ether) and Bio-clean (D-Limonene 5% SL), @1ml/L of water do not have adverse effects on human and environmental health and are compatible with biocontrol

agents. Possible use of additional biopesticides should be explored.

Conclusion

The rugose spiraling whitefly is polyphagous, but it is a serious pest of coconut. It does not kill the host plant; however, it interferes with the normal growth. Various plants have been identified as hosts. An effective natural enemy, *Encarsia guadeloupae*, has been recorded. Conservation biological control needs to be adopted for safe and sustainable management of this pest.

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Author Credit: Md. Shahadath Hossain, Madhab Chandra Das, Md. Sharafat Hossain, and Rangaswamy Muniappan (2022).

Disclaimer: This bulletin was created and distributed by the United States Agency for International Development (USAID) funded Feed the Future Bangladesh Integrated Pest Management Activity. It was made possible through USAID and the generous support of the American people through USAID Cooperative Agreement Associate Award No. 72038821LA0001 under the Leader with Associate Cooperative Agreement No. AID-OAA-L-15-00001. The contents are the responsibility of IPMA and do not necessarily reflect the views of USAID or the United States Government.

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